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Disinfection and Disinfectants.

BY W. J. YOUNG, F.R.C.V.S., D.V.S.M. (Vict.), Veterinary Inspector, Ministry of Agriculture and Fisheries.

A rapid review of the existing knowledge concerning the manner in which disinfectants act and descriptions of some materials used for disinfecting purposes appear to be suitable subjects for discussion at a conference of veterinary inspectors. The money spent on well-directed and intellectually-controlled disinfection is justifiable. Each disease requires special consideration in order that it can be prevented or eradicated by disinfection.

Only those familiar with the peculiarities of each infection and in possession of the knowledge concerning the most suitable disinfectants to employ should be placed in charge of the labour employed to carry out the processes necessary for the defeat of the invisible enemies which prefer to engage in battle strongly entrenched.

In this paper no mention will be made of disinfecting the external parasites found on the skins of the domesticated animals—such as the treatment of equine mange, or sheep scab. These subjects could be more properly discussed at a meeting solely composed of veterinary surgeons, but before dismissing them, it is as well to point out that much waste of time, material and money is at present practised by stockowners through their neglect to follow sound advice given them as to the best manner of eradicating the parasitic diseases of the skin by the use of disinfectants.

If it were possible to have all the sheep in Great Britain gathered, and properly dipped by total immersion in suitable materials, three times within a month, sheep scab would be eradicated.

By *disinfection* we mean the destruction of the agents causing infection or the conversion of a place, animal or thing from a potentially infective state into one which is free from infection.

The destruction of all lower forms of animal and vegetable life that may be in or on an object is *sterilisation*.

A *disinfectant* or *germicide* is an agent that destroys pathogenic organisms and their spores.

Many of the agents used in veterinary practice are potent enough to sterilise objects with which they come in contact.

(Paper presented to the Veterinary Inspectors' Conference held in conjunction with the 1921 Congress of the Royal Sanitary Institute at Folkestone.)

A *deodorant* is a substance which has the power to destroy or neutralise the unpleasant odours arising from organic matter undergoing fermentation or putrefaction. Smells are destroyed by deodorants and germs by disinfectants, and it is well to remember that many disinfectants are also deodorants, but that all deodorisers are by no means disinfectants.

Antiseptics are substances which prevent decomposition and decay. A solution of 1 to 300,000 mercuric chloride will sometimes prevent the germination of the spores of anthrax, whereas it required a 1 to 1,000 solution to destroy them.

The chemical nature of microbes.—Chemical analysis shows that microbes contain 84 to 85 per cent. of water, and dried bacteria contain various proportions of carbon, nitrogen, hydrogen, oxygen, sulphur, phosphorus and chlorine, combined with sodium, calcium, magnesium and potassium.

These elements are grouped in bacteria to form organic bodies such as proteids, fats, and allied substances, carbohydrates (doubtful) and ferments.

Most pathogenic bacteria will not grow in acid media. Some grow when exposed to nitrogen and oxgyen, while others, such as the *Bacillus tetani* is incapable of growing on oxygen.

Few grow in the presence of hydrogen sulphide, while others produce it. Neutral gases such as hydrogen, nitrogen and carbon monoxide seem to have little action one way or the other.

In nature bacteria are usually embedded in albuminous matter, and this handicaps germicidal action.

In an experiment it was found that anthrax bacilli suspended in water were killed in a few minutes with bichloride of mercury 1 to 500,000; in bouillon it required 1 to 40,000; while in blood serum 1 to 2,000 was not always effective.

THE ACTION OF PHYSICAL AGENTS ON MICROBES.

(*a*) *Desiccation* when absolute is fatal to them. The spores of anthrax can live in a dry atmosphere for nearly two years and yield cultures after that time and cause disease.

Non-sporing bacteria generally die within a few weeks or months when desiccated.

Those facts are important in practical disinfection.

(*b*) *Agitation* interferes with the multiplication of organisms, but does not kill them.

(*c*) *Gravity.*—In most cases experimental results show that gravity has little detrimental effect on the cultivation of microbes.

(*d*) *Pressure.*—Compressed oxygen at the pressure of 8 to 10 atmospheres will arrest fermentation.

Compressed air at pressure of 600 atmospheres does not modify the virulence of anthrax bacilli.

A pressure of 3,000 atmospheres only slightly affects the spores of anthrax.

(*e*) *Electricity* has been used experimentally in the sterilisation of milk. Electric light has no direct action on bacteria.

(*f*) *Light.*—Direct sunlight prevents the growth of germs by producing oxidation changes and the action is influenced by the nature of the medium and the nature of the bacteria themselves.

It is probable that the ultra-violet rays of the spectrum are destructive to their growth in nature.

(*g*) *Temperature.*—This is of great importance in the study of disinfection. It helps us to understand the principles of refrigeration as applied in the preservation of goods by cold storage.

We might safely say that the common range of temperature for the growth and multiplication of bacteria is from 4°C. to 45°C.

The bacillus of typhoid fever has been kept in ice for a period of 103 days without being killed.

The spores of anthrax and tetanus are killed in a few minutes at boiling temperature, whereas the spores of blackleg generally resist boiling for two hours. Penetration is a necessary factor when heat is used for disinfection. Most microbes are killed by exposure to 150°C. for 30 minutes. There is a complete analogy existing between chemical reaction and disinfection, one reagent being represented by the disinfectant and the other by the protoplasm of the bacteria.

It has been strongly urged that warm solutions of disinfectants should be used in practice owing to this analogy.

Anthrax spores which surviced the effects of a 5 per cent. solution of carbolic acid for 36 days at room temperature were destroyed in half-an-hour in the same solution at 55°C.

At 75°C. it took only three minutes to kill them, and a 3 per cent. solution killed the spores at this temperature in 15 minutes, while a 1 per cent. solution took from 2 to 2½ hours.

How bacteria are killed.—Many are undoubtedly poisoned by disinfectants, but there are some problems still unsolved connected with this action.

In some cases a chemical union takes place between the proteid material and the disinfectant, and in others the proteid becomes coagulated. Chick and Martin have observed that the particles of an emulsion or soapy preparation of the coal-tar acids exhibit Brownian movement. The bacteria are considerably larger than the mean diameter of the emulsified particles and may plainly be seen to be bombarded by these particles. In this way the bacteria are frequently brought into intimate contact with the undiluted particles of coal tar acids.

The maximum effect may therefore be obtained and the death of the bacteria in inevitable.

The coal tar acids in suspension act upon the bacteria first through physiological absorption and secondarily through chemical combination. In order to keep this paper within reasonable limits the subject cannot be fully discussed. Recent investigations, however, show that disinfectants act in four ways:—

(1) Destruction by oxidation, *e.g.*, ozone, chlorinated lime, potassium permanganate, and the halogens.

(2) Destruction by ionic poison with coagulation, *e.g.*, the metallic salts.

(3) Destruction by coagulation and poisoning not ionic in character, *e.g.*, carbolic acid and phenol derivatives.

(4) Destruction by emulsoid action, that is, through Brownian movement and absorption.

Disinfectants.

For purposes of description they can be divided into two groups.

(1) *Physical.*—Wind, sunlight, heat and electricity.

(2) *Chemical.*—Gases, liquids and solids.

The wind aids in rendering associated material dry, but as a disinfectant it is too slow in its action.

It usually requires about 30 hours' sunning to kill an anthrax spore, while the bacillus is killed in one or two hours when subjected to the same conditions.

When heat is used as a disinfectant exceptional care must be taken that it does not damage the materials subjected to it.

Dry heat is in daily use for disinfecting and sterilising laboratory apparatus. It can be used in the form of direct flame, such as from a painter's lamp, and this method is frequently used in veterinary practice for disinfecting anthrax blood. Moist heat may be used in the form of saturated or super-heated steam, but it is unsuitable for disinfecting harness.

Boiling water is prescribed as a disinfectant in the Rabies Order of 1919, which states " the enclosure or thing shall, if not forthwith destroyed by burning, be immersed in boiling water for not less than ten minutes; or be immersed or soaked or drenched in or with a suitable disinfectant."

Saturated steam is water vapour, which condenses readily if the temperature is slightly lowered or if the pressure is increased. It is a good conveyor of heat owing to the readiness with which it condenses and gives off its latent heat. The latent heat of steam is the heat or energy expended in converting water at 100°C. into steam.

About 1,700 c.c. of steam at 100°C. becomes changed into 1c.c. of water at 100°C. With condensation there is considerable displacement of air produced by the shrinking, and this allows the steam to penetrate further and to condense upon the deeper layers of the objects, such as clothing, subjected to it.

Super-heated steam has a higher temperature than that of ordinary steam under equal atmospheric pressure and is always dry and cannot tolerate the presence of water. It behaves as a gas and is a bad conveyor and conductor of heat. As a disinfectant it cannot be recommended.

Gaseous disinfectants have certain advantages.

By using a gas the risk of overlooking any infected surface in a building can be obviated. Most of the gases used are easily generated and economical.

Chlorine is very efficient, but poisonous, and must be used in a damp atmosphere. To disinfect 1,000

cubic feet of space, use 1 to 2 pounds of chlorinated lime to which 6 ounces of strong sulphuric acid should be added cautiously. No animals must be permitted in the building undergoing disinfection by this method. The gas may also be generated by using the following mixture :—

Common salt	8	ounces.
Manganese dioxide ...	2	,,
Sulphuric acid	2	,,
Water	2	,,

Mix the water and acid and then pour on the salt and manganese in an earthenware basin which should rest on sand or in water The reaction is as follows :—

$$2NaCl + MnO_2 + 3H_2SO_4 = 2NaHSO_2 + MnSO_4 + 2H_2O + Cl_2.$$

The author of this paper has satisfactorily generated chlorine gas from bleaching powder by the addition of crude carbolic acid.

Sulphur dioxide gas is not a strong disinfectant, although useful. It is cheap and easily produced and requires a damp atmosphere. Metallic work is damaged by it and it bleaches coloured articles. To disinfect 1,000 cubic feet of space 5 pounds of sulphur are required. It can be produced by burning sulphur or by decomposing any sulphite with a dilute mineral acid.

$$CaSO_3 + 2HCl = CaCl_2 + H_2O + SO_2.$$

When a bisulphate and a bisulphite are placed together and moistened, sulphur dioxide is liberated.

$$NaHSO_4 + NaHSO_3 = Na_2SO_4 + H_2O + SO_2.$$

This gas can be obtained in small tins which are very useful and safe when owners object to having burning sulphur in their buildings.

Formaldehyde is a superior disinfectant, and is one of the most powerful germicides known, and its action is not interfered with by albuminous substances. Its chief disadvantages are that it has a strong tendency to condense in cold weather and it has weak powers of penetration.

For successful results a certain amount of heat and moisture is necessary. If the temperature is below 65°F., or the relative humidity is below 60 per cent., the results become irregular.

Formalin is the name given to a 40 per cent. solution of formaldehyde. The gas may be used in the following ways :—

(*a*) By generating the gas in portable autoclaves under pressure.

The pressure of three atmospheres is generally used, and 10 ounces of formalin are required per 1,000 feet of air space.

A mixture of glycerine, calcium chlorite and formalin is placed in the autoclave, and heat is generated by means of a primus stove.

(*b*) Retort without pressure.

Formalin is heated in a retort and it becomes thick and syrupy before the gas escapes.

(*c* Liberation by chemical means :—

(1) The Pennsylvania Department of Health use the ollowing mixture :—

Sodium dichromate ...	10	ounces.
Formalin	16	,,
Commercial sulphuric acid	1½	,,

(2) Platinized asbestos method.

Methyl alcohol is used in a lamp so constructed that platinized asbestos is placed above the wick. The action that takes place is :—

$$CH_3OH + O = CH_2O + H_2O.$$

After burning a time the flame is extinguished and air combines with the vapour of the alcohol and keeps the asbestos incandescent.

Not less than 25 ounces of methyl alcohol should be employed for 1,000 cubic feet.

(*d*) The Permanganate-Formalin method.

When 6 parts of formalin and 5 parts of potassium permanganate are mixed, 50 per cent. of the formalin is liberated in the form of gas.

For disinfecting 1,000 cubic feet of air space, Dosset of the Bureau of Animal Industry, U.S.A., recommends the use of 20 ounces of formalin and 16⅔ ounces of potassium permanganate, and states that the needle shaped crystals of the salt should be used. The reactions that take place are :—

$$3HCOH + 2KMnO_4 = 3HCOOH + K_2O + 2MnO_2.$$
$$K_2O + 2HCOOH = 2HCOOK + H_2O.$$
$$3HCOOH + 2KMnO_4 = K_2CO_3 + 2MnO_2 + 3H_2O + 2CO_2.$$

Care must be taken that there is no live fire or flame in the building being disinfected by this method, as the liberated gas is slightly inflammable. For eliminating flies from stables, cowsheds, and other premises the use of formalin by this method is excellent.

The author has frequently disinfected his clothes, when they have become soiled with foot-and-mouth disease virus, in a wardrobe by this method.

For large operations the permanganate may be conveniently made into bricks with 15 per cent. of Portland cement and a sufficiency of water, afterwards drying the bricks.

Formalin can also be used as a spray.

Half to one per cent. solutions are satisfactory disinfectants.

The sprayer should wear gloves and goggles as formalin is an irritant.

Solid and liquid disinfectants.—*Lime* in the freshly slaked state is a valuable and economical disinfectant. It is slaked by the addition of water in the proportion of one pint to two pounds of lime, and can be used dry or mixed with water and applied to walls by means of a brush or spraying machine. A 20 per cent. solution is generally used.

Chlorinated lime or bleaching powder is a substance with a problematical chemical composition. Good samples should contain not less than 33 per cent. of available chlorine.

A solution of half to one per cent. strength will kill most bacteria in one to five minutes, and a five per cent. solution destroys spores within an hour. It may also be used in the dry state.

Article 3 (2) of the Anthrax Order of 1910 prescribes that "the occupier *shall* also disinfect as soon as possible with chloride of lime any place where the

carcase of a diseased or suspected animal has lain or where its blood has escaped."

A solution of boracic acid and chlorinated lime (two ounces of each per gallon of water) is extensively used in veterinary practice.

Antiformin consists of equal parts of Liq. sodii chlorinatæ B.P. and a 15 per cent. solution of caustic soda.

Used in 5 per cent. solution it kills bacteria readily, but cannot be depended upon to destroy acid fast organisms, *e.g.*, bacilli of tubercle and Johne's disease.

Corrosive sublimate has many disadvantages which limit its use.

It forms with albumen an inert insoluble compound, is extremely poisonous and has a corrosive action on metals.

One per cent solution will destroy anthrax spores in 20 minutes, although one hour's exposure to 1 to 1,000 has no effect. The best results are obtained by the addition to the sublimate of half per cent. of sulphuric or hydrochloric acid, when the spores will be killed in 75 minutes' exposure to a 1 to 200 solution.

Coal-tar and its products.—A volume could be written on this subject, and the allotted time and space only allows of some being mentioned.

Carbolic acid or phenol is reasonably effective for destroying non-sporing bacteria, and its action is only slightly interfered with by albuminous substances. Failure to destroy spores and its expense are its chief disadvantages.

Crude carbolic acid is a mixture of phenols and cresols. It is soluble in water with difficulty and extremely uncertain in its action. Deposits of coal-tar oils and other impurities are left on articles disinfected with it, and if used as a spray the solution requires constant stirring.

Cresol or cresylic acid is a good germicide in two per cent. solution. Many sheep dips contain this substance mixed with soap and other alkalies.

General Remarks and Conclusion.

In order to keep this paper within reasonable limits many disinfectants in daily use have not been criticised, nor have any directions been given as to the best methods of carrying out adequate disinfection.

Concerning standardisation of disinfectants, we must remember that the figure given to a disinfectant varies for different organisms, and that certain organisms show various degrees of resistance to disinfectants.

Moreover, the inhibitory or antiseptic action must be distinguished from the germicidal.

We hope for the day when there will be an *international standard* with clearly defined rules of procedure to adopt when testing disinfectants. At present some investigators work with one organism, others with another, and different times of contact are used.

In the interests of public health, agriculture, honest traders and those whose duty it is to prevent and eradicate disease, it is essential that official control be exercised over all proprietary disinfectants and that approved strengths for use against pathogenic organisms and viruses should be stated on the labels, which should be securely fastened to the containers.

It is of little use to the veterinary or any other inspector appointed to execute the provisions of the Diseases of Animals Acts and the Orders made thereunder to know what is the carbolic co-efficient of a disinfectant.

What is required is a knowledge of the strengths that are lethal to the disease producers.

This paper would be incomplete if no mention were made of the cleansing of infected premises and articles. It is a most important operation and one that requires diligent supervision.

Discussion.

The Chairman said that in the Army they had obtained the most satisfactory results from the use of what Mr. Young described as a blow-lamp for disinfecting stables. In alluding to whitewash he said it was not a disinfectant as ordinarily prepared; when the walls of buildings had been whitewashed, before they could be thoroughly disinfected it was necessary to remove the whitewash. The best means of doing this was the use of live steam. Having removed the whitewash they could then run a blow lamp over the walls, floors and fittings of the buildings. If properly employed, the blow lamp did not seriously damage paint work.

In order to get rid of the ammonia, which frequently caused inconvenience on the lower deck of cattle ships, they had found that cloths soaked in chlorinated lime quickly turned the gas into chloride of ammonia, and so removed its irritating fumes.

Mr. T. Parker remarked that with regard to sheep dipping, he understood the author to say that if they brought the sheep all into one centre and dipped them three times within a month they would get rid of sheep scab. He considered, however, that information as to the exact length of time the parasite would reside off the animal highly important, *i.e.*, how long the parasite would live on the woodwork and other places in farm buildings. Such a question, of course, was one—as to exactness—referable to experimental enquiry; nevertheless, it was highly important from the point of view of preventive medicine. He congratulated Mr. Young on his most informative and exhaustive paper, the best he had listened to on the subject.

Mr. Male (Reading), said that they realised that some of these parasites took a great deal of killing. With regard to the sun as a disinfector it was absolutely useless with regard to tubercle baccilli, which remained alive on ground-infected pastures for at least twelve months sometimes. The sun, therefore, could scarcely be relied upon to kill tubercle bacilli.

Col. Leighton expressed the opinion that if they could get a control exercised for proprietary disinfectants it would be a great reform.

Mr. W. J. Young, in replying to the discussion, stated that he considered the proposal that there

should be an international standard for disinfectants, was very important. He made a strong plea for more co-operation in the work of physicists, chemists, parasitologists and bacteriologists regarding disinfectants and for research into the proper strengths to use them.

The disinfection of tubercle bacilli by the sun was too slow, and he had more faith in chemicals.

His experience of sheep scab led him to believe that the parasite did not cause disease on other species, certainly not in man, and he was satisfied that the parasite did not live long on goats when transferred to them.

No definite opinion could be given as to the length of time that the *acari* of scab remained alive apart from sheep.

In reply to a question regarding a cattle-carrying ship, he stated that the processes of cleansing and disinfection should be under veterinary supervision, and that the vessel should be enabled to sail at her usual time. For disinfecting ships, chlorinated lime was recommended.

Scaly Leg in Fowls.*

By A. W. Noel Pillers, F.R.C.V.S. (Liverpool).

Scaly leg is well known in most European countries and in America. It is frequently referred to in text books upon poultry, acari, and parasitic diseases of the lower animals. Although interested in the disease before the war, I think it is now much more common than formerly, and often there appear to be more birds affected in each run. The keeping of increased numbers in small pens may explain these points. The disease does not spread from bird to bird very rapidly, and five out of twenty-two is the highest percentage I have seen affected in one run. Often only an odd bird or two can be found showing symptoms. It is stated that common-bred fowls resist contagion longer than other breeds, but I have seen it most often in crossbreds and the "barn door" type. It is possible that such birds do not receive the same attention as the pure ones.

Chances of infection must be considerable in the crates, baskets, and pens used in the trade.

The acarus which causes the disease, *Cnemidocoptes mutans* (Robin and Lanquetin, 1859). belongs to the family Sarcoptidæ. *C. viviparus* (Furstenberg, 1870); *Dermatoryctes mutans* (Ehlers, 1873), and *Sarcoptes mutans* (Robin and Lanquetin, 1859), are the chief synonyms.

The general characters of the parasite are shown in Figs. 1 and 2. It is viviparous. The following measurements are taken from Megnin.*

	mm. long.	mm. broad.
Larva	·17	·10
Nymph	·26	·18
Male	·25	·15
Pubescent Female ...	·38	·33
Fecundated Female ...	·47	·39

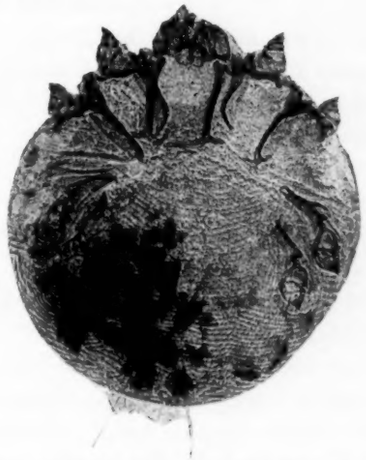

Fig. 1.—*Cnemidocoptes mutans.* Female. Ventral aspect x120.

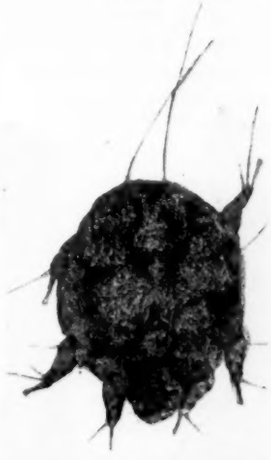

Fig. 2.—*Cnemidocoptes mutans.*. Hexapod larva. Dorsal aspect x170.

Both females (Fig. 1) are without ambulacral suckers at the ends of all the legs; the larva (Fig. 2), nymph and male have them on all their legs. This is quite a different state of affairs from that which prevails in *Sarcoptes.*

The lesions appear to commence under the scales of the leg and digits at their common junction. As far as my experience goes, it is practically always on the inner aspect of the limb. If Figs. 3 and 4 are compared, it will be seen that the extent of the disease is much less on the external surface of all

* This note has been written at the request of the Editors.

* Megnin. "Les Parasites articulés." Paris, 1895.

the affected limbs. As a result of the production of a mass of cells and serum under the scales they stick up at their free edges. The disease then appears on the areas free from horny scales, and then gradually extends upwards on the lateral aspects of the limb at the side of the flexor tendons (Figs. 3b and c). Both of the legs there depicted yielded parasites just below the feathers. The disease is usually very slow in its progress, and many months are often necessary to produce such an advanced case as shown at Figs. 3 and 4.

It is to be regretted that a great number of works such as those of NEUMANN, THEOBALD, RAILLIET KAUPP, SCHINDELKA, HERMS, and NEUVEU-LEMAIRE all figure very extensively affected legs similar to the one just referred to; such figures are not really typical of the disease as ordinarily encountered among the birds of hen fanciers.

The material which is gradually piled up as the disease progresses has a honeycombed appearance when examined under the lens, especially that portion by which it has been attached. The large scales and material under them are gradually knocked off, so that the limb looks as if covered with a dirty grey material, with here and there small areas of serum and blood.

It is stated that toes may drop off, and that there may be marked lameness. The parasites become more active as the legs become warm when the birds are perched. One often sees the affected parts being attacked with the beak. After a long while the general health is reduced to a state of marasmus. It is stated that the turkey, guinea fowl, partridge and some cage birds also get the disease. It is common to hear affected birds called "old" on account of the condition of the legs.

Moderately affected birds do well if as much of the scaly material as possible is removed by soaking in hot soapy water, and any of the ordinary agents used against acari applied on three or four occasions. The treatment of pens and runs should follow general lines, and if the legs of in-contacts are dressed, a brush should be used to get under the scales on the front of the digits and legs.

FIG. 3.—Internal aspect. (*a*) normal leg, (*b*) and (*c*) early scaly leg, (*d*) very advanced scaly leg.

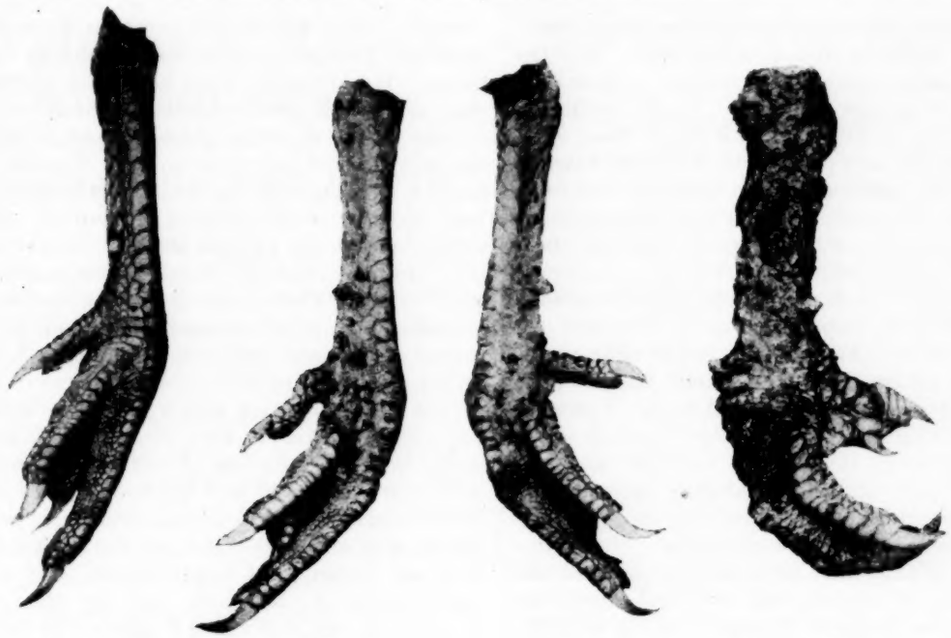

FIG. 4.—External aspect. *a b c d* as in Fig. 3. Note the lesser extent of the disease on the outer aspects of the legs.

Reciprocity and the Canadian Cattle Embargo.

BY MAJOR-GENERAL SIR J. MOORE, K.C.M.G., C.B., F.R.C.V.S., Army Veterinary Service (Retired).

The finding of the Royal Commission on the importation of store cattle divides public thought into two main streams. On one hand disappointment and doubt are expressed that the removal of the embargo and the admission of live cattle from overseas will give a set-back to the home agricultural industry, while on the other hand it is affirmed that the measure will afford satisfaction and relief to the meat trade, the producer and consumer thereby being respectively affected. The question, however, opens up a far broader field of policy than is at first apparent, whether such concerns the producer, narrow-minded or otherwise, or the consumer who rightly clamours for cheaper meat.

I hope I may be pardoned in adding to the expression of opinion which already has been given freely on the subject generally, and in the particular dircetion which knowledge of animals and experience of conditions affecting them gained in service during the past thirty-two years in Canada, the United States of America, Argentine, South Africa (including Rhodesia), Australia, India, on the Continent, and at home, may perhaps qualify me.

The bogey of contagious diseases of cattle being introduced into the British Isles by the importation of live-stock from Canada lies more in imagination than reality. The Veterinary Services of the Board of Agriculture and of the Dominion of Canada exist for the express purpose of preventing and controlling diseases of all kinds, and for safeguarding the interests of the agricultural communities of both countries. Surely, if our Armies, surrounded as they were by foot-and-mouth disease among cattle in France and Belgium, and with epizootic lymphangitis in horses in their midst, could control these disesesa so that, in spite of the difficult circumstances of war, not a single case of disease was introduced into Great Britain on the return of troops either through the medium of men or animals, the prevention of the introduction of contagious diseases in the quieter times of peace should be child's play in comparison. An argrument in favour of prohibition based on the fear of contagious disease could not possibly stand.

It is difficult to see how the importation of young stock from approved countries could seriously affect the farming community of the United Kingdom. Putting on one side narrow-minded insular conceptions which are apt to be deeply rooted, I venture to affirm that the innovation would enhance the prosperity of both the individual farmer and the State for the following reasons. A glance at the large English meat market returns will show that at least 80 per cent. of beef is imported. Why is this ? Apart from the cheaper price of imported over home-grown meat, one strong reason is that the stock production of the United Kingdom is inadequate to meet the demands of the consumers. It is idle to suppose that the public would prefer to eat frozen meat because it is purchaseable at a lower rate than home-grown. To my certain knowledge the working miner of the North Country, prior to the war, insisted on the home-grown article and willingly gave a higher retail price than that existing for imported meat.

If, therefore, the United Kingdom is unable to meet the demands or wishes of the community by reason of the fact that the supply of home-grown fresh beef is insufficient, obviously the correct line is to encourage production, and if the present sources of store cattle

fail to furnish the required numbers, unquestionably they should be obtained from other sources. A little wholesale competition would be beneficial in encouraging production in greater quantity. English pedigree stock-breeders need have no fear that their well-established business and position in the world's cattle trade would be assailed. Our carefully-selected pedigree strains of cattle, whether for the raising of animals most suitable for beef or milk, will hold their own against all exhibitors or breeders in other countries.

To me the policy which governs this question should be looked at from an Imperial point of view, and not with insular vision. Anyone who has lived in touch with our Commonwealths, Dominions and Dependencies beyond the seas cannot fail to be impressed with a deep recognition of the great bond of blood relationship between the Mother Country and the rest of the Empire, and of the abiding necessity for furthering the interests of those nations who are bone of our bone and flesh of our flesh.

The matter of Canadian store cattle is a small one in that country's concern, but it foreshadows the desire of that live factor of Empire to trade with the Mother Country to the greater prosperity and glory of the latter. I remember in 1904 when on a mission to Canada to consider a scheme for horse purchase in that country in the event of war, I was much interested in certain remarks of well-informed and influential Canadians on the subject of reciprocity, their opinion being that Canada was all out for reciprocity with the Mother Country. If she did not obtain it from the latter they feared reciprocal arrangements would be made with her next door neighbour, which would be "the beginning of the end," meaning that the interests of the two contiguous countries would so merge into each other that eventually they would become one whole. Such is conceivable. The fine, business-like American becomes a very good Canadian citizen, and while remaining faithful to the country of his adoption, it is natural that the land of his birth lends colour to his actions in life. It is therefore imperative from an Imperial point of view to foster by every means in our power those relations of Empire which lead to unity, common prosperity, and ultimate strength.

The removal of the embargo and the admission of store cattle, as I have remarked, is or would be a small matter in Canada's commercial enterprise. Behind this is the consideration of the export of chilled meat, and furthermore the increased production of grain, of which all bear considerable relation to each other, and to the necessary immigration and employment of our own people.

It cannot but be a grief to anyone having Imperial interests at heart to witness at the Smithfield Markets in London the names of Argentine, American and other firms who do not represent our Colonial interests. By far the greatest amount of beef there displayed is received from South America (Argentine) with some from North America (Birkenhead killed). Very little comes from our Colonies, although a consignment of chilled meat was received recently from Canada. This was landed fourteen days after being killed at Toronto, and in my judgment was prime meat. If well-fed beef can be landed under a chilled process in such good, wholesome condition, it would appear to me that the public would be more satisfactorily served by custom with Canada than by trading with other countries further afield where hard freezing is necessitated. Another point which strikes one at the Central Markets, Smithfield, is that with the exception of Dutch importation (veal and pork chiefly), there is no indication on the labels of the dates on which animals were killed, the meat inspected, or put into cold storage. I think the public is entitled to have information as to the period of time the meat, for which they are compelled to pay a heavy price, has been frozen. It is not possible to tell how long quarters of beef have been in storage, and even if a side of beef has been known to be quite fit for food after eighteen years in store, it goes without saying that the fresher it is, or the shorter the period between killing and consumption, the more it is appreciated by the public and by the palate. If Canada can supply English markets with beef fourteen days after slaughter, it stands to reason that from a practical point of view, to say nothing of the Imperial aspect of trade, our support should go out to her in preference to that at present given to countries outside our Empire. I am confident that the supply of dead meat would suit her better than the supply of store cattle, which at best are of considerably less value in trade. At the same time the open door of importation of young stock from Canada should be maintained to encourage a greater output of home-fed fresh beef, which is so highly appreciated by the public of the United Kingdom, and as an inducement to the agricultural community of the British Isles to increase the number of their stock, and to continue further progress in the quality of their herds.—*Country Life*.

R.V.C.M.A. (London) Awards.

The annual general meeting of the Royal Veterinary College Medical Association was held on Tuesday, 11th October, 1921, in the New Theatre of the Royal Veterinary College, London, when the medals and fellowship certificates of the Association for the year 1920-21 were presented as follows:—

Gold medal for Prize Essay—Mr. W. P. V. Byrne.

Silver medal for Prize Essay—Mr. R. W. A. Watchorn.

Class D silver medal—Mr. V. P. Byrne.

Class C silver medal—Mr. R. L. Cornell.

Class B silver medal—Mr. E. B. D. Hall.

Class A silver medal—Mr. J. C. Davidson.

Fellowship certificates.—P. V. Byrne, C. V. Davies, F. Donne, A. E. Gilmore, R. E. Glover, S. V. Golledge, J. Heath, N. S. King, R. G. Nurse, R. W. A. Watchorn, and R. Watts.

The Veterinary Record.

15th October, 1921.

ROAD RIGHTS OF THE HORSE.

That touch of arrogance which, from the inception of motor traffic, has characterised the attitude of the pleasure-seeking devotee of speed to the vitally handsome and far less offensive horse, has attained its climax in the deliberate refusal to consider, in the make-up of the modern road, the travelling rights of that animal. It was undoubtedly with regret that a horse-loving nation turned, of necessity, to the adoption of mechanical power for business traction, and we are convinced that no utilitarian users of motor-cars, and least of all the veterinary surgeons amongst them, will hesitate to describe as scandalous the state of affairs revealed in the following paragraph from a farming paper: "No fewer than fourteen accidents—mainly to farmers on their way to factories in the early morning with their milk—have occurred in one Devonshire village through horses slipping on tarred roads. In many parts the surface is just like glass."

The honourable past of the horse in this country has assuredly to be supplemented by a useful future, and, meanwhile, there are far too many representatives of the animal that still remains the practitioner's best friend using the road to permit of this intolerable tacit assumption of his extinction passing without protest.

Some provision for the safe journeying of the horse must be made in road construction, wide as are the issues raised by a consideration of the remedy. The traditional desire of the motorist for the whole of the road must not be allowed to prejudice the safety of a patron which can still appeal for consideration on the ground of utility, in addition to the old-established right of priority and the unassailable plea of humanity.

We hear of the gradual disappearance of the "poor man's path" of green at the road-side, concurrently with that of the simple macadamised strip essential for the safety of the horse flanking the glazed tar-macadamised surface devoted to the interests of those awheel. The unwieldy colossus of motor traction has satisfactorily established himself in the road centre—horse and foot have long since been pushed to the side, submitting to the inevitable. But we do object to being pushed off the road altogether.

Abstracts and Reviews.

Veterinary Hygiene.

A reproach which has often been hurled at teachers of veterinary subjects in our Colleges is that they have failed to supply the practitioner and student with succinct up-to-date reviews in the shape of text books of the particular branches which they profess to teach. And there can be no doubt that the main body of our profession has not been supplied with faithful and easily assimilable digests of actually recorded information in its current literature. It is obviously a duty of teachers who are yearly impelled to pass under review the existing knowledge on their subjects to issue in published form the summaries thus compiled. In other professions this need is met with by an adequate supply of handy text books, frequently revised and brought up to date, and by the insertion of scholarly contributions in their periodicals. On the other hand, in the case of our profession the student during his years of study is compelled to take down laboriously a series of notes often handed down for many years with but little change, and amounting almost to a part of the traditional property of the institution to which he has become attached, while the practitioner does not often find a studious article devoted to some particular aspect of his vocation in the most easily accessible periodical professional literature. The Principal of the Royal (Dick) Veterinary College (Dr. Bradley) has endeavoured more than any living member of the profession to remedy this grave defect, for, in addition to the performance of the duties in connection with his post and the exalted positions which he now occupies in the counsels of the profession, he recently placed before the profession for a few years a symposium of all veterinary and cognate knowledge in the form of *The Veterinary Review*, which, however, has, unfortunately, owing to financial embarrassment, become defunct, and again under his general editorship a series of substantial text books are now being placed before the profession known as the *Edinburgh Veterinary Series*. Works on anatomy and physiology have already appeared in this series, and the latest edition is the text book now under review, viz., *Veterinary Hygiene*, by Professor R. G. Linton, M.R.C.V.S., who occupies the Chair of Hygiene at the Edinburgh College.

Now that such a series of works is being placed before the profession, it may be said at the outset that it is the solemn duty of every member to give the general editor and the authors of these works their strongest support lest, through apathy, the same fate may befall this highly beneficent task which is being accomplished for the profession as befell *The Veterinary Review*. Indeed, with a profession that is numerically small, and the possible circulation therefore necessarily strictly limited, it is incumbent upon all its members to encourage the enthusiasm of those who are striving to place within their reach exact knowledge upon the several branches of their

vocation, the monetary remuneration for which, in any case, is almost negligible.

Before dealing in particular with Professor Linton's newly published text book, it is perhaps well to acquaint the reader with the fact that the College to which he is attached was the first in this country to recognise the great modern importance of the subject upon which he writes by instituting a separate and special Chair of Hygiene, with special material and other facilities for the teaching of the subject. Elsewhere this vast subject was entrusted until recently to the occupant of some other Chair, or even to a newly-qualified student, and when one comes to consider the manifold branches of science which are deeply delved into or touched upon when a sufficient study is made of this all-important subject Hygiene—the science or the art of preserving health—it is small wonder that students in the past after emerging through their course have failed to become impressed with the importance of the subject. At the Institution to which Professor Linton is attached hygiene now assumes an importance at least equal to that of any of the other veterinary subjects taught during the college curriculum, and, moreover, the hygiene teachings inculcated into those post-graduate students who aspire to obtaining the Diploma of Veterinary State Medicine of the Royal College of Veterinary Surgeons are of a high order.

In his preface Professor Linton says that "this book has been written in the hope that it will be of assistance to veterinary students, veterinary practitioners, and others concerned with the well-being of animals. The requirements of those studying for the Diploma of Veterinary State Medicine have been kept in mind and special attention has been given to certain branches of public health work with which they should be conversant. Other sections of veterinary science which might have been included, such as Dietetics, Zootechny, and Milk Hygiene, have been omitted, as their importance merits a more detailed consideration than could be accorded in one volume. It is anticipated that they will later form additions to the series." It immediately occurs to one that the general plan adopted in this book is open perhaps to serious objection, and more particularly from the point of view of the student. The volume already runs to 429 pages, and its price is 26s. The student naturally objects to a multiplicity of text books dealing with any one of his class subjects and it might have been wise if in a volume of these dimensions and this price the space had been devoted entirely to the needs of the students, and that in it the general principles of the whole subject had been elucidated according to some co-ordinated plan.

The present volume contains sections dealing respectively with water, meteorology, sanitation, air and ventilation, building construction, preventive medicine, and sanitary law. A large part of the book is taken up by the sections dealing with preventive medicine and sanitary law (pp. 193-415) and comprises information upon which the student feels he is not likely to be examined at the end of his course, although, on the other hand, it is these particular sections which are of paramount importance to the general practitioner and the veterinary inspector. Students of hygiene at our Colleges have always experienced an uncomfortable feeling that questions quite outside their teachings or their readings might be asked of them at their examination, and hence have often come to regard the subject as a badly potted mass of knowledge involving any stray piece of veterinary information which does not fall within the purview of the other subjects taught in the curriculum. This misapprehension should be remedied, and it seems that Professor Linton could have rendered a great service to the students if he had written a systematic and connected treatise embracing all the principal factors upon which the health of animals depends. After all, this need not have been difficult, although it is quite appreciated that the subject is a many-sided one. The health of our animals, as well as that of all other living beings, depends upon the state of harmony which exists between the animal or other living organism on the one hand and the environmental conditions on the other, and these can be roughly divided into six separate factors, viz.: (1) a sufficiency of air; (2) sufficiency of water; (3) suitable temperature; (4) sufficiency of food; (5) adequate room; and (6) freedom from the attack of enemies, whether gross or minute. Again, when the optimum environmental conditions are reached by the elimination of all limiting factors and the particular species attains its maximum development as a result of enjoying perfect "health" conditions, further development can be traced or may be arrived at by studying the principles of genetics or breeding, or as Professor Linton calls it, by an ugly French word, "Zootechny."

There are several points of view in the first four sections which might very likely be considerably modified with a more profound knowledge of the underlying sciences of pathology and physiology. The section on water particularly is obscure, and the facts are largely obselete in the light of modern knowledge. For example, on page 2, line 6, it is stated: "Surface water that has been in contact with human or animal excreta may be dangerous, and water from the surface or arable land should not be considered fit for drinking purposes until such time as it has been purified." This statement is apt to convey a quite erroneous impression upon the minds of the veterinary student, although later on, on pages 20-21, the author explains in a few paragraphs the significance of so-called polluted water in the hygiene of animals, and, in fact, in the light of existing knowledge very little more than is contained in these paragraphs need have been said on the hygiene of water as far as animals are concerned. For since time immemorial wild animals have drunk of surface water, without purification, and have remained in perfect health, and it is now known that so-called purification of water is of great importance in human hygiene, inasmuch as it is otherwise apt to be contaminated with certain disease-producing organisms—typhoid or dysentery bacilli—which may gain access

to it with the fæces of " carriers " of these organisms. No animal disease of any importance is conveyed to an appreciable extent through the medium of water except parasitic diseases due to the ingestion of the eggs or the early stages in the life history of the gross animal parasites. Apart from these circumstances, as far as we know the only other precaution that need be taken with water is to supply it in plenty, and, if possible, free from considerable mineral or organic material in suspension. The constant quotation in text books on hygiene of the findings of the River Pollutions Commissioners, arrived at in pre-bacteriological days, and detailed instructions with regard to chemical analysis for suspected organic pollution, are quite irrelevant from the standpoint of the veterinarian. For the sake of completeness they might be inserted, but in any case they should be relegated to the smallest type used in the work.

It might be said that in these respects Professor Linton is following a tendency that has always existed in so-called veterinary hygiene to follow the precepts of human hygiene—a tendency which, according to some, should be dropped, as the mode of life of the species under consideration differ to such a marked degree. However, there are now in existence excellent text books of human hygiene, for example, Rosenau's Preventive Medicine and Hygiene, which deal with the general principles of hygiene in a precise and accurate manner, and the plan and methods adopted in these books might with advantage be studied.

Again, in the section on air and ventilation it is doubtful whether Professor Linton has become altogether convinced by the very recent work of FLUGGE'S school and LEONARD HILL'S school, which would seem to have altogether upset our pre-conceived notions with regard to the underlying principles of ventilation.

Several improvements suggest themselves in the course of a perusal of the book, and in particular it seems that the names of a number of standard works of reference or original articles might be appended to each section whereby the reader desirous of obtaining further detailed information might be readily directed to authoritative sources.

A great deal of highly technical information is contained in the book and on the whole it is conveyed in an intelligible manner. Professor Linton has wisely secured tthe aid of specialists in dealing with these different problems. In particular, the information supplied on building construction is extremely lucid and to the point. The chapter on sanitation is also well done, although perhaps from a practical standpoint drain traps and drain pipes are not of such importance in preserving the health of animals as the student has been taught to believe.

Although, as stated before, the considerable portion of the book dealing with preventive medicine and sanitary law is of small importance to the student from an examination standpoint, it in reality forms the best part of the book, and we venture to state that in no language has there as yet appeared such a considerable amount of precise and accurate information upon the prevention of specific animal diseases. For this reason the book should form an essential part of the reference library of every veterinary surgeon. The prophylaxis of every important animal disease is dwelt upon briefly, and yet all the relevant facts connected therewith are presented in a clear, convincing manner. Professor Linton also deserves well for having presented in a readable manner a summary of all the important legislation dealing with animal disease. In compiling the chapter on preventive medicine he has been fortunate in securing the aid of a trained bacteriologist, Captain F. C. Minett, M.B.E., R.A.V.C.

It is our earnest hope that this work will run into several editions, and that Professor Linton will thus have an opportunity of introducing into it the results of his more profound and considered views on this all-important and many-sided study. We look forward with intense interest to the publication of the other sections on veterinary hygiene, as in particular it is now high time that an authoritative treatise on dietetics embracing the great advances in knowledge that have been made on this subject in recent years were placed in the hands of the veterinary student.

The book is dedicated to Major-General Sir Frederick Smith, K.C.M.G., C.B., who well deserves the title of Father of Veterinary Hygiene in this country, and whose well-known text book on the subject has now gone out of print. Professor Linton has stepped in to fill the breach thus made in a most worthy manner. The publishers' part of the work has been very well done; the print is large and clear, the paper is of good quality, and the book is well bound. Members of the National are invited to give this work every encouragement.

J. T. E.

[R. G. LINTON, M.R.C.V.S., Professor of Hygiene, Royal (Dick) Veterinary College. *Veterinary Hygiene*, 429 pp., with 92 text figs. 1921. Edinburgh: W. Green and Son, Ltd. Price 26s. net.]

Unclassified African Equine Disease.

The horses are attacked only between the months of May and October. The first symptom is generally intestinal trouble, followed by fever lasting from five to eight days, during which the temperature rises to 40.5° or 41° C., and the animal suffers from somnolence, prostration and complete loss of appetite, the mucosa is sub-icteric, the eyes markedly bloodshot, and there is considerable anæmia and weakness. As the fever falls the symptoms become less severe, but the pallor of the mucosa and the weakness remain. During the subsequent attacks of fever (there are usually three or four), which occur at intervals varying from eight days to two and a half months, the rise in temperature is less acute, and the symptoms generally milder. The prognosis is favourable. When the termination is fatal, autopsy shows extreme pallor of all organs. The body is greatly

emaciated. The conjunctivæ are yellowish-white, and covered with echymoses if death has occurred during a violent attack of fever. The spleen is hypertrophied, the liver nearly always cardiac, often sclerous and engorged with blood. The kidneys show an interstitial nephritis with more or less extensive sclerosis of the medulla and cortex. The heart is frequently hypertrophied, the walls of the ventricles flabby, and the valvulæ thickened at the edges. Microscopic examination of the organs is negative. Neither spirilla, filaria nor piroplasma have ever been found in the blood, and the disease is not transmissible to dogs, guinea-pigs, or white rats. No case of direct contagion has been observed. As regards treatment, the various forms of arsenic have proved ineffective.

As a large number of animals are attacked, and the symptoms and geographical distribution of the disease are identical with those of trypanosomiasis, the author remarks on the necessity for great care in diagnosis, seeing that the former is of a much less serious character than the latter. The only certain means of differentiation is by inoculation into dogs.

[VELU, H. and BALOZET. *Note on an Unclassified Disease of the Horse in Morocco.* Bulletin de la Société de Pathological Exotique.)

"Limberneck" in India.

A peculiarly fatal disease has appeared amongst fowls in Lahore. The information is, of necessity, somewhat vague, as only one outbreak has occurred up to the time of writing (February, 1921), and in that most of the fowls died so suddenly that a thorough examination, such as the writers would wish, could not be carried out.

The symptoms displayed are those of "limberneck," a fowl disease very prevalent and well known in America, and are briefly as follows :—

The first symptoms are those of lack of co-ordination with a slightly staggering gait. Later, the fowl attempts to preserve its balance by assuming a curiously upright position. At this stage, when persuaded to move, it lifts its feet abnormally high and gives one the impression it is attempting to "goose step." The loss of co-ordination increases until complete, when the bird appears almost paralysed. Death ensues soon afterwards.

The time which elapses between the first appearance of symptoms and death varies in individual cases from one to eight days.

The birds attempt to eat throughout the period of illness until the time of death.

From the above brief account it will be seen that the symptoms closely resemble those found in fowls suffering from a "deficiency disease," but the diet which the fowls were receiving eliminates any possible chance of the latter. The etiology of the disease is at present obscure. Post-mortem examinations failed to reveal anything of a pathogenic nature.

Emulsions of the brains and spinal cords of the diseased fowls were made and injected subcutaneously and intra-spinally into healthy fowls and rabbits, but failed to convey the disease. Microscopic examinations of the blood, brain and spinal cord were negative. A curious fact, and one well worthy of note, is that the pen consisted of twenty-five English birds and twenty-five country-breds. All the twenty-five English birds became affected, twenty-three of which died. None of the country-breds contracted the disease.

All the birds were housed together and lived under identically similar conditions.

The writers regret that, at the present juncture, they cannot offer any advice as regards specific treatment of the disease, but would suggest that, at the outset of an outbreak, the healthy fowls should be at once taken away from the pen and kept elsewhere. When more material is obtainable, more work will be done and, it is hoped, a more definite statement will be made on it.

(W. TAYLOR and E. SEWELL, Punjab Veterinary College, Lahore. *Agric. Journal of India*).

Romanowsky Stains.

Agulhon and Léobardy draw attention to some rules which should be observed if the best use is to be made of this kind of stain.

All Romanowsky stains consist of a mixture of basic colouring matter (the blues, azur, violet) and of acid eosin. The former stains best in a slightly alkaline medium, the latter in a distinctly acid one.

For staining the elements of the blood it is better to favour the eosin, so the water used for diluting the stain ought to be slightly acid. The correct degree of acidity is obtained by exact neutralisation in the presence of Dibromcresolsulphonephthalein, when the Ph will be between 6 and 7.

For protistological work the basic elements of the stain are the most important, and to obtain the best results from these without unduly ruining the action of eosin one should use water exactly neutral to neutral red. This is orange coloured at the correct Ph of 7 to 8.

As a matter of fact the slightly acid condition favourable to the eosin is generally found in ordinary distilled water. Nevertheless such water should be tested, as it becomes alkaline from being kept in ordinary glass vessels, in which case one must neutralise it with dilute acetic acid. One ought carefully to avoid the use of receptacles cleaned with alkaline solutions and insufficiently rinsed. Old slides, too, behave as if alkaline, and should be washed before use in a weak solution of boric acid.

Fixation with the concentrated stain is accompanied by acid staining, so one must not overdo this process. Basic staining takes place after the concentrated fixative stain has been diluted; so the longer this diluted stain acts the greater the actual and relative depth of such colouration.

For rapid Giemsa staining the following is recommended :

(1) Pour on to the slide sufficient drops to cover it. Let it act for exactly 30 seconds.

(2) Dilute with an equal quantity of water of the correct Ph concentration, and let the diluted stain act for half an hour.

(3) Wash with the same kind of distilled water.

(5) Dry with Joseph filter paper.

[Agulhon and J. de Leobardy—*Comptes Rendus*, 1921. Vol. 84. No. 3, p. 120.]

Remarks on Blood Staining.

(1) Keep the slides in soapy water. Old slides can be boiled in dilute sulphuric acid, washed several times in slightly alkaline water, then in pure, distilled water. They are then transferred to a jar filled with soapy water (*eau de savon asser concentrée*). Before use the slides are washed in several changes of water.

(2) Moist fixation with osmic acid vapor. Some drops of osmic acid solution (1 to 2 per cent.) are poured into a glass box. Before making the blood-smear, one exposes the dry slide face downwards to the vapor of the acid. After the smear has been made, the *wet* surface is poised anew on the vessel so that the vapor can act for 20 seconds on the film. If the vessel containing the acid is closed tightly, there is little waste, and a small quantity of acid will serve for a long time.

(3) Fix by means of may-grunwald stain. The film, which is now dry, is covered with may-grunwald stain for five minutes. This should be done while the slide is enclosed in a petri dish, to avoid evaporation.

(4) Stain and differentiate in a very dilute solution of methylene blue. One prepares the following solution :— Methylene blue, 2 grammes ; Solution of borax (5 per cent. concentration), 100 grammes. One takes a few drops of this stain and dilutes it freely, and one pours about 10 cc. of this solution on to the slide, and one rocks the petri dish for 40 to 50 seconds.

(5) Wash in running water, then dry the film without exposing it to any heat.

The chromatin is sharply coloured blue ; all the granules are stained as by the classical panoptic method.

The advantages of this method consist in a good fixation with osmic acid, and in the colouration being independent of the instability of the may-grunwald solution.

[Paul Weill, *Comptes Rendus*, 1921. Vol. 84. No. 4, p. 229.]

Clinical and Case Reports.

Tæniasis in Lambs.—High Mortality.

By Henry Taylor, F.R.C.V.S., Haywards Heath.

During the last seventeen years I cannot recollect meeting with more than one other outbreak of tæniasis amongst sheep, and in that instance the death rate was as nothing compared to the one in question. In the present case thirty-six lambs died out of sixty-eight, which gives a mortality of over 50 per cent.

There are one or two features in connection with the case which are worth noting. The farm is not a marshy one, but, on the contrary, is on the slope of a hill. There is a small acreage of ground near a river, which might be classed as rather low lying, but this was occupied by some tegs, none of which became affected, or rather, one should say, as far as could be observed. At any rate they showed no symptoms.

On visiting the farm on May 2nd there were two lambs dead, on which *post-mortem* examinations were made.

Symptoms.—Before, however, proceeding to that, the live lambs were examined ; many of them were obviously ill, the chief symptoms being diarrhœa, causing the fleece to be soiled, weakness, prostration, trembling, in some cases convulsions, and entire loss of appetite. The indication pointed to and my general experience led me to suspect parasitic gastritis, though the owner said he believed they had been poisoned, but could not account for it.

Post-mortem.—*Lamb No.* 1.—Rumen *slightly* inflamed in a few places, no unusual leaves or shoots ; lungs congested ; no filaria ; fourth stomach normal ; no worms visible to the naked eye, and upon putting some of the stomach contents (also scraping from the mucous membrane) under the microscope, only one strangle (probably *gracilis*) was seen. The small intestine looked rather pale, and on slitting up, masses of tape-worm were seen as thick as a blacklead pencil, which could be pulled out over a yard long. The small intestines seemed to contain tape-worms for practically all its length.

Lamb No. 2.—Lungs congested ; small intestines full of tape-worms ; stomach contained no *strongyles*.

Lamb No. 3.—As this was in a dying condition, it was slaughtered for diagnostic purposes. Masses of tape-worms were present in the intestines, but no other lesions were present.

From the naked eye appearance of the tape-worm, it seemed to be *expansa*—in fact, I have very little doubt about it, but, unfortunately, I did not bring a specimen away with me.

Regarding the cause of the death and illness amongst the lambs, one could not come to any other conclusion than that the worms were responsible, and it is worth while mentioning that a few *post-mortems* were made subsequent to my one and only visit, by a trustworthy shepherd, who found " plenty of tape-worms, but nothing else."

Treatment.—After a fast, each lamb received approximately 1 dr. pulv. nucis areca, with a very small quantity of antim. pot. tart., followed an hour later by a dose containing 1 oz. ol. tereb. and some ol. lini. The medicine was repeated in a few days' time, but the infestation was so bad that for a few days the animals continued to die. None of the ewes died ; one or two of the worst looking ones were also dosed.

The following table indicates the deaths :—

One lamb died on April 29th, two died on April 30th, eight died on May 1st, ten died on May 2nd, the day I made the examination, and after which the remainder were dosed ; twelve died on May 3rd and 4th, none died on May 5th, three died on May 6th, after which there were no more losses.

As previously indicated, thirty-six died out of sixty-eight, which is a startling mortality.

Remarks.—The ewes were Southdowns, mostly bred on the place, no fresh ones having been brought on for two years. Some of them, during the above period, were affected and had diarrhœa, with consequent loss of condition, but none died. They were grazed on the meadows the greater part of the winter. After lambing they were turned into a seven-acre field, which had not had sheep on during the winter, then into a nine-acre field, which likewise had not been pastured by sheep in the winter months, and finally into the field in which the outbreak occurred, which was dry ground on the top of a hill. The lambs would not start grazing until six weeks old, and at the time of the onset of the disease were about three months old. This rather tends to suggest that the worms are of rapid growth. The tegs of the flock which were turned into the brook meadow were all right as far as one could judge.

A Curious Case.

By Henry Taylor, F.R.C.V.S., Haywards Heath.

Subject.—A Jersey cow, about 10 years old.

History.—One morning, without apparent cause, she refused her food, and as there was no action of the bowels during that day, it was thought that the case was one of simple stomach derangement. Accordingly a dose of ammon. carb. and ½lb. of sulphate of soda was administered.

Symptoms.—During the next four days there was not the slightest appetite and practically no fæces were passed. Then a strong purgative was given without result. All this time the cow looked quite well and bright, and had no pain, but ate nothing. At the end of a week the owner began to administer gruel, and nux vomica and ammon. carb. were the medicines used. Diarrhœa came on at the end of about ten days, and continued more or less until death supervened at the expiration of a *month* from the onset. During the whole of that time I do not suppose she ate what would have sufficed for a meal for an ordinary cow.

Post-mortem.—This did not clear the matter up. Beyond a few *small* patches of congestion there were no naked eye intestinal lesions. The cow was due to calve in a fortnight when she died, and some portions of the uterine attachments of the fœtal membranes rather suggested some septic condition; but why the extraordinarily sudden and persistent loss of appetite?

The temperature was normal throughout, and there was no rumination.

Association Reports.

Midland Counties V.M.A.

The quarterly meeting of the Midland Counties Veterinary Medical Association was held at Holliday Street Wharf, Birmingham, by kind permission of the Birmingham Corporation (per Mr. B. de Vine), on Wednesday, August 31st. Mr. H. S. Reynolds, president of the Association, occupied the chair, and there were also present the following members: Messrs. H. L. Pemberton (Bridgnorth), J. Cormack (Coventry), T. Slipper (Sutton Coldfield), R. H. Over (Rugby), H. Yeomans (Smethwick), J. Robertson (Stourbridge), C. J. Clifford (Shifnal), R. C. Trigger (Newcastle-under-Lyme), P. M. Evershed (Nottingham), J. C. Deville (Uttoxeter), F. B. O. Taylor (Stratford-on-Avon), G. F. Barham (Stratford-on-Avon), R. P. Holmes (Birmingham), B. Secker (Malvern), G. Howie (Birmingham), L. W. Heelis (Solihull), J. Young (Birmingham), R. Lake (Ashby-de-la-Zouch), P. J. Lindsay (Tamworth), C. S. Hunting (Loughborough), T. D. M. Martin (Wellington), W. F. Aston (Ludlow), J. W. Conchie (Kidderminster), J. E. Hutchinson (Eccleshall), W. H. Brooke (Handsworth), R. Murray (Rugeley), W. White (Birmingham), A. B. Forsyth (Cannock), R. L. Green (Dudley), J. M. Whyte (Tenbury), H. E. Powell (Coalville), J. R. A. Jones (Gloucester), H. W. Dawes (West Bromwich), and the Hon. Secretary (Mr. H. J. Dawes (West Bromwich) The visitors present included Professor E. Brayley Reynolds, J. W. Conchie, A. A. Forsyth, F. E. Jelbart, and Sadler.

Apologies for absence were received from Professor Hobday, Messrs. W. Trigger, H. Tudor Hughes, M. Sadler, R. C. Phillips, J. J. Burchnall, J. R. Carless, T. J. Brain, T. Ludlow, J. O. Powley, E. Franklin, T. H. Hobson, J. Martin, junr., D. Forwell, J. Martin, sen., W. Grasby, T. Chambers, A. Over, B. de Vine, Trevor Spencer, F. Chambers, and others.

Minutes of Council.—The following minutes of a meeting of the Council of the Association held earlier in the day were submitted:—

Recommended, that the next quarterly meeting of the Association be held at Stafford, and that Mr. J. O. Powley be asked to read his paper on "Rabies," which was postponed from the May meeting.

A letter was read from the National Veterinary Association on the subject of insurance fees. It was pointed out that the position was much more satisfactory than it used to be, and it was recommended that the Secretary, in his reply, should express sympathy with the suggestion to regularise insurance fees and request a copy of the proposed schedule, which this Association would be prepared to discuss.

The Secretary mentioned that after consultation with the President he had arranged for the insurance of a mare which was to be the subject of a demonstration of ovariotomy that day. It was recommended that the action of the President and Secretary be endorsed.

On the motion of Mr. Trigger, seconded by Mr. Pemberton, the minutes were approved and the recommendations endorsed.

N.A.V.I. criticised.—Mr. Conchie referred to the question of fees paid by the County Council of Worcestershire to veterinary inspectors. They were still working on the pre-war rate. They had held

several meetings, and had threatened to come out on strike, but held their hand on the receipt of a letter from Mr. Trevor Spencer to the effect that the National Association of Veterinary Inspectors were doing what they could in the matter. However, nothing had been done.

The HON. SECRETARY said he was present at a meeting of the N.A.V.I., when Mr. Franklin attended to lay the Worcestershire grievance before the Association. Mr. Franklin said they had resigned in a body, and other people had been asked to do the work. The advice Mr. Franklin got was that they should withdraw their resignations. It was mentioned that the fees paid by Staffordshire were very fair. Mr. Conchie's criticism of the N.A.V.I. was scarcely fair, as they had already done a fair amount of work.

Mr. TRIGGER agreed that Staffordshire had fixed their scale very fair. He believed Staffordshire owed their position to the action of the N.A.V.I.

Mr. CONCHIE thought Worcestershire should be on all fours with Staffordshire.

Mr. PEMBERTON said he endorsed all that Mr. Conchie had said. Shropshire was very little better, and they formed a small association in that county to try and get the position remedied. The matter was brought forward before the County Council and vetoed.

Mr. DE VILLE said he practised on the borders of Derbyshire and Staffordshire. As had been said, Staffordshire paid very fair, and Derbyshire just as badly.

Eventually, a resolution, moved by Mr. CONCHIE, and seconded by Mr. DE VILLE, was carried, urging the National Association of Veterinary Inspectors to hurry up the question of improved fees in Worcestershire, Derbyshire and Shropshire.

POLL-EVIL AND OVARIOTOMY.

Professor BRAYLEY REYNOLDS gave a practical demonstration of the operations for ovariotomy and poll-evil, and afterwards a discussion took place, mainly on the subject of poll-evil.

Professor REYNOLDS said that as the operation for poll-evil he had performed differed from that usually carried out, they might like a little information on the reason for doing certain things in a certain way. Perhaps what struck most of the onlookers more than anything else was the apparent lack of provision for drainage. The incision had been along the highest part of the poll, and the cavity now existing was without any apparent drainage. When the new methods of the treatment of wounds were employed, drainage could be looked upon not so much as a necessity as a luxury. If drainage could be obtained without mutilating important structures, by all means get it, because, not only would the wound probably heal more quickly, but it would not require quite such particular attention. It was a mistake, however, to suppose that a wound would not heal without proper drainage. The two chief new methods of treating wounds were by the use of some antiseptic paste, and by continuous or interrupted irrigation with eusol, which was a ·5 per cent. solution of hypochlorous acid. This was easily and cheaply made—one ounce each of boracic acid and chlorinated lime in 80 ounces of water. The mixture should be shaken over night and decanted in the morning. Provided chlorinated lime of good quality was used, the mixture would come out at about ·5 per cent. of hypochlorous acid. In human practice the solution was standardized to contain ·5 per cent. The ideal way was to apply it continuously until the wound was quite clean, but there might be difficulties in the way of doing this in veterinary practice which could not easily be overcome. Continuous irrigation for, say, two hours night and morning would be sufficient, or would, at least, answer the purpose. He would recommend two hours' continuous irrigation night and morning for a week for a wound of this description. Some thought this was a lot of trouble, and said it could not be done on a farm, but if by this means they could cure a case of poll-evil in five weeks, no trouble should be too great. The operation itself, as they had seen, was really nothing; it was very simple. But in his, the speaker's, opinion it was the first week's treatment that mattered; and this should be carried out very thoroughly. The main objective was to prevent an extension of infection down the ligamentum nuchæ where it had been divided. When once the divided end was granulated over there was very little likelihood of any extension of infection. Some might ask, why take out this part of the ligament, and especially in a case like this one, when it was only slightly or not at all affected. The object was to get a big open wound at the top so as to allow easy cleansing of the wound and a free escape of the discharge. At the end of a week's irrigation the wound probably would, if one might use such an expression, look after itself; not that he recommended such a course, and he most certainly would not leave it to do so if he could possibly avoid it. After six or seven weeks it should be examined closely to see if there was any dead tissue remaining, and, if so, this should be removed. "Irrigate with eusol for at least a week, and if you have the means and don't think it too much trouble, go on irrigating a little longer." A further argument often used against irrigation with eusol was the large amount of the solution that was required. However, a large quantity was not necessary, and he showed his hearers a method of so arranging the end of the tube of the irrigator that a pint of the solution would last for over an hour. He also explained in detail how he attached the tube to the wound and made allowance for the patient moving its head. One point he would impress upon his hearers was not to use a twitch. The exercising of a little patience was all that was necessary. The patient would soon submit to the method. A marked feature of eusol irrigation was the rapidity with which pain disappeared from the wound. He would suggest packing the wound the first three or four days, between irrigations, with cotton wool soaked in eusol and powdered with eupad.

There was one other point to which he would like to refer, and that was to the use of vaccines in such cases. He had heard of cases being cured with vaccines without surgery, and of others in which a certain amount of surgery had been employed together with vaccines. He would not go so far as to say vaccines were no use. They might be of some assistance, but speaking from personal experience, and that had been chiefly with autogenous vaccines made from the particular cases themselves, he had never been able to persuade himself that their use had shortened the period of healing by so much as one day.

Mr. Dawes had asked him to make some reference to fistulous withers. The surgical treatment of fistulous withers was too big a subject to be dealt with in a few remarks. One might talk for a very long time and still leave much untouched upon. He would make only a few remarks in so far as a similar method of operating to that for poll-evil has been adopted. In his experience it had not been anything like so successful. He wished for nothing better for poll-evil, but the method as applied for fistulous withers left much to be desired. The greater variation in the lesion of fistulous withers partly accounted for this. This method of operating—the mesial incision—was best for fistulous withers in that one could see exactly what one was doing, and could easily get at the diseased tissues which were causing the trouble; but, unfortunately, healing did not seem to take place

so readily or quickly. One, and perhaps the chief, reason for this slower healing was the formation of the withers. Being more prominent and ridge like than the poll, there was a greater tendency for the divided tissues to fall apart down either side, and so, even in cases where extension of the lesion was arrested and healing commenced immediately after operating, final healing and apposition of the divided tissues took a very long time. He had tried several modifications of the method, but was not yet satisfied.

Mr. H. W. DAWES said he was sure he was voicing the opinion of everyone present when he said how much they appreciated the very skilful manner in which Professor Reynolds had performed the two operations that day. The one that perhaps had the most interest to the practitioners present was the operation for poll-evil. With all due deference to the Professor, however, he could not help challenging his statement that the healing process would be complete in five weeks. The treatment of operation wounds by continuous irrigation was already very firmly established, and it was very successful if one could go to the trouble of carrying out the necessary technique. Under the conditions of general practice it was scarcely possible to carry out all the details. In the original Carrell-Dakin treatment great emphasis was laid on a daily bacteriological examination of smears taken from the wound discharge with a view to determining the amount of infection present in the wound, and upon this amount of infection determined the length of the period of irrigation. A certain amount of difficulty was met with in the animal disturbing the position of the irrigation tubes, and this could be overcome by attaching the tubes to small split rings inserted in the edges of the skin wound. Professor Reynolds had suggested that the irrigation might cease after ten days, but this would seem to depend on the progress of the wound. He would like to know whether any modification of the operation might have to be made in the event of a number of old-standing sinuses being in existence. There was one more point: sometimes the after results of an operation for poll-evil were hampered by the formation of large and excessive masses of granulation tissue, and this formation was very difficult to deal with. In this operation did he find this condition arise, and, if so, did it give rise to any trouble?

Mr. WHYTE said he had the pleasure of being a neighbour of Professor Reynolds in France during the war, and in dealing with wounds of any kind he tried to get drainage at any cost. One day, however, a horse was brought in with a shell-wound in the leg, and if he had tried to effect drainage it would have meant nearly cutting the leg off. He therefore was obliged to let it go without drainage, and it healed all right. For that reason, he supported what Professor Reynolds said about drainage not being absolutely necessary, although all must admit it was an advantage if it could be obtained without incurring any extra risk.

Mr. FORSYTH said he would like to express his personal thanks to Professor Reynolds for his demonstration, which was more use to the general practitioner than any number of papers. He would like to ask the Professor what his view was on the question of turning animals out to grass after recovery from the operation. Under the old system, after an apparent recovery, they were often troubled with a recurrence of poll-evil after the animal had been turned out for a few days.

Mr. BROOKE said he should have hesitated before removing so much of the ligament as Professor Reynolds. Probably he (the speaker) had had a mistaken idea as to the function of the ligamentum nuchæ. He always thought it was to prevent muscular exertion when raising the head. He should have thought that complete severance would cause depression of the head, or else why was the ligament there? He would like to know the Professor's experience of the percentage of injury to the ligament and injury to the bone, and would he observe the same technique in opening for diseased bone as for diseased ligament?

Professor REYNOLDS, replying to the questions addressed to him, said it was very difficult, in making such casual remarks as he had done, to cover every point, but he was glad to find that so much interest had been shown in the work he had done. Answering Mr. Dawes, junr., he would not say the edges of the divided skin had come together and the wound completely healed in five weeks. He did not mean that. What he meant was that in five weeks' time the wound would be in such a condition that one could say confidently the animal was cured of poll-evil and that there was nothing more to be done to it. He had seen cases in which at the end of five weeks the divided edges were all but together. As to the fixing of the tubes, there was, of course, a tendency for them to come out, but not so great a tendency as to be a nuisance. What he generally did was to tie a piece of tape round the tube and attach it to one of the sutures. When the sutures were removed an ordinary pig ring might be put in the edge of the skin and the tube tied to it. A piece of cotton wool placed along the wound would keep the tube from rising. As the wound healed there was slightly more difficulty in keeping the tubes in, but it was not so great that it could not be overcome.

Taking smears of the wound discharge in order to ascertain the bacterial condition, as carried out in human practice, was the ideal method, but in human practice provision was made against re-infection. Unfortunately, the surroundings under which irrigation had to be carried out in animals were such that a degree of the re-infection was almost bound to occur. Examination of smears, therefore, could not give information that would be definitely helpful. This did not mean, however, that irrigation with eusol was not far in advance of older methods. The question had been asked as to whether excessive granulation of the wounded surfaces occurred. Perhaps the most noticeable feature following eusol irrigation was the naked eye appearances of the raw surfaces. They were bright pink in colour, firm and smooth, and particularly free from soft granulation tissue. So certain almost should these appearances be, that they could be taken as a guide as to whether the solution used was of the right strength. With regard to the existence of sinuses, he said he would operate in the same way and would in addition curette out any sinuses, afterwards packing them with a little gauze powdered with eupad, and them ignore them. They would soon heal up.

Turning out to grass an animal that was, or had been, suffering from poll-evil was an important question, and one in regard to which there was a great difference of opinion. Many people held the view that such an animal should always be fed out of a manger and not allowed to put its head down. He thought the origin of this view was that as poll-evil arose as a bursitis, probably in the majority of cases as a non-purulent one, many cases in the early stages might show a tendency to subside when the animal was fed out of a manger, whereas when allowed to feed off the ground, an aggravation or recurrence of the condition would be likely to occur. On the other hand, one might argue that, when an animal had been operated upon, and after about a week when any extension of the infection appeared to be overcome, better drainage of the wound would be obtained by the animal putting its head down as in the act of grazing. Several cases upon which he had operated had been treated in this way with apparently no harmful results. Personally, he would have no hesitation in turning an animal out to grass when once it had been successfully operated upon for poll-evil. No harm could possibly result. In operating he never touched bone if he could avoid it. It had been recommended in America to groove the occipital bone to assist drainage. He had no hesiration in saying this was wrong. If the bone was diseased and one had to curette it, that was a different matter. Mr. Brooke seemed surprised that the head should not fall after severance and removal of a portion of the ligamentum nuchæ. However, no such effect occurred, which went to show that although the ligament might assist the muscles in maintaining the head in position, the ligament itself was not essential for that purpose. He would like to say in conclusion that it had given him great pleasure to attend that day and

give the demonstrations. He would always be pleased to do what he could for the Midland Association, for apart from the fact that his brother was president for the ensuing year, his father, many years ago, had helped to found it.

The HON. SECRETARY moved a vote of thanks to Professor Reynolds, who had proved himself a very fine surgeon. Thoroughness was his motto, and after what they had seen that day they need not be surprised that he should meet with so much success. If any argument was necessary to induce practitioners to join this Association, it was the usefulness of such demonstrations as they had just witnessed. It had been a pleasure to them afterwards to listen to such a master of his subject as Professor Reynolds. No wonder they had had such a good attendance, and the Association were very grateful to him for all he had done. He would like to associate with the vote of thanks the name of Mr. Brennan de Vine, whose influence in getting them the use of the yard and providing a subject for the ovariotomy operation, had not only been a great convenience, but had also saved the Association much expense. Also a vote of thanks to Mr. Connell for providing a subject for the operation for poll evil.

Mr. CORMACK seconded the vote of thanks, which was heartily agreed to.

The members, as usual, had tea together at the Grand Hotel.

H. J. DAWES, F.R.C.V.S., *Hon. Sec.*

Notes and News

HORSE EXPORTATION.

The following reassuring statements concerning the present conditions prevailing in regard to the exportation of horses to the Continent occur in a letter received at the Ministry of Agriculture and Fisheries from Mr. Brennan de Vine, Chief Veterinary Inspector for the city of Birmingham :—

"As Birmingham is a large centre for the disposal of cast-off or worn-out horses which are purchased for shipment abroad, it was considered advisable that I, as Chief Veterinary Inspector, and therefore responsible for the work carried out under the Animals Transit Order, should see the conditions of inspection and exportation of horses at the ports.

I saw the horses on board two ships at Hull, and found that each horse was allotted a stall, and that all were liberally fed. The voyage takes about 20 to 24 hours, but there is sufficient food on board to last the horses three days.

Judging from the examination of the Veterinary Inspectors at Hull, no horse is now shipped abroad unless it is fit for work, and I understand that totally blind animals are debarred from being shipped.

From Hull I travelled by boat to Antwerp, on which there were over 50 horses. I saw the horses several times during the voyage on the Saturday night and at different times on the Sunday, and found that they were amply fed and watered during the whole of the time. On Monday, the 6th June, I saw the animals disembarked—some of these were sold on the quayside ; the remainder were brought to the market at Antwerp and sold on the Monday afternoon.

From what I saw of the animals from the time I went to Hull until they were purchased by the butchers in the market at Antwerp, there was no cruelty to the animals, care being exercised at every part of the journey to keep them as comfortable as possible, and to see that they were properly watered and fed.

If the conditions such as I saw are continued, and there is no relaxation on the part of the inspectors, I consider that there is no necessity for any change in the present method."

The medals won by the students of the Glasgow Veterinary College were presented on October 4th, in the Lecture Room of the College, Buccleuch Street, Sir Hugh Shaw Stewart, Bart., C.B., presiding.

Mr. Archibald MacNeilage gave the opening address, taking as his subject, "Stock Problems Awaiting Solution."

According to the figures published in the *Militär-wochenblatt*, giving the total German casualties in the Great War up to August, 1921, the following are the casualties amongst the officers of the veterinary service : —

Veterinary officers and assistant veterinary surgeons :—Wounded		158
	Killed	183

—(*Deutsche Tierärztliche Wochenschrift*, 1st October, 1921.)

Swansea M.R.C.V.S. Fatally Kicked.

The death has occurred at Swansea of Mr. J. Murray Stewart, veterinary surgeon, from injuries received through a horse kicking him on the head.

Mr. Stewart was a very well-known figure in the veterinary world, and was prominently connected with the Association of Veterinary Surgeons of Wales and Monmouthshire. It appears that on Saturday, the 8th inst., he was attending to a horse, when the animal kicked him, and he was rendered unconscious. Medical aid failed to prevent his condition growing worse, and he passed away on the Sunday night.

The deceased gentleman leaves a widow and a daughter, and the circumstances are particularly sad, as they were away from Swansea on holiday at the time.

Mr. Stewart was about 60 years of age, and came to Swansea 30 years ago as assistant to the late Mr. Dow, and he afterwards established an extensive practice on his own account.

A World's Milk Record.—What is believed to be a world's record yield of milk in proportion to the animal's body weight has been given by a goat belonging to Mrs. Potton, of Rayleigh, Essex. Weighing just under 100 lbs. and standing only 26 inches high, the goat was milked three times in one day and gave a few ounces above 20lbs., or two gallons of milk. This is over one-fifth of her entire body weight, and no cow has yielded in milk more than one-seventh of her body weight in 24 hours.

At Builth Wells (Brecon) a blacksmith was fined £1 for docking seven ponies without using an anæsthetic. The owner of five of the ponies was also fined £1, and the owners of the other two 10s. each.

BELTED CATTLE.

General Sir Ian Hamilton, who owns a herd of Belted Galloway cattle at Lullenden Farm, East Grinstead, Sussex, writing to *The Times*, gives an interesting example of the impressiveness of the belted strain of the Galloway breed when crossed with other types. By accident a belted bull one year old got at a young red heifer (15 months old), half Shorthorn (pedigree) and half Sussex (pedigree), and on Thursday the heifer gave birth to "a beautiful little belted heifer calf," without a trace of Sussex or Shorthorn type or marking, but with two small round black spots in the belt.

In the House recently, Mr. Forrest asked the Minister of Agriculture whether there had been recent instances in which the use of arsenic to improve the hair and skin of pigs for exhibition purposes had been followed by fatal results; and whether, in the public interest, he could state if arsenic was ever given to pigs to be used as food.

Sir A. Boscawen replied that the Ministry had received no reports with reference to the use of arsenic for the purpose in question, and no instance had been brought to the Ministry's notice of arsenic being given to pigs which are intended for food.

Obituary.

CAPTAIN H. CHOWN, R.A.V.C.

We regret to announce the death of Captain Harry Chown, R.A.V.C., attached to the Egyptian Army, who was killed at Nyala, Southern Darfur, as the result of a local native rising on the 26th September, 1921.

Captain Chown, who was the son of Mr. Henry Chown, of Blagraves, Mapledurham, near Reading, was born on the 3rd of January, 1891. He was educated at the University College, Reading, and qualified from the London Veterinary College on the 22nd December, 1914.

Previous to joining the Royal Army Veterinary Corps he served with the Berkshire Yeomanry, 1908-09; University College of Reading O.T.C., 1909-10; and 1st County of London Yeomanry, 1912-13.

On the 29th December, 1914, he was appointed to a commission as lieutenant in the Special Reserve of Officers, Army Veterinary Corps, and on the 22nd September, 1915, he was granted a regular commission in the R.A.V.C. in the rank of captain.

During the early part of the Great War he was attached to the 28th Division, the 4th Reserve Cavalry Regiment, No. 2 Reserve Veterinary Hospital and the 13th Division. He proceeded to France as officer commanding the 48th Mobile Veterinary Section, 36th (Ulster) Division, on the 3rd October, 1915, and served with this formation until the 3rd of September, 1918, when he returned to England for the purpose of taking up an appointment with the Egyptian Army, and at the time of his death was District Inspecting Veterinary Officer, Southern Durfar, Sudan.

Captain Chown was a very promising young officer, and was greatly liked by all with whom he came in contact. He proved himself a most capable mobile veterinary section commander, and for his services in the Great War he was mentioned in despatches and received the 1914-15 star and British War and Victory medals.

We wish to express our sincerest sympathy with his relatives and greatly deplore the loss of this gallant young officer.

CADE, WILLIAM JAMES.—On September 27th, at 1 Royal York Villas, Clifton, Mr. William James Cade, for many years local Veterinary Inspector to the City of Bristol, aged 54 years.

Correspondence.

Letters to the Editors should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue

The Editor does not hold himself responsible for the opinions of his correspondents.

Vaccine and Serum Therapy.

Sirs,—In three recent numbers of the *Veterinary Record* you have published an extremely interesting paper by Mr. W. M. Scott, F.R.C.V.S., on "Poll Evil and Fistulous Withers," with the discussion following it. The portion devoted to auto vaccine therapy is, unfortunately, all too short, but is undoubtedly the most interesting from a modern point of view. Mr. Scott is to be heartily congratulated on the enthusiasm and energy which he, as a private practitioner, has thrown into this side of his subject. For many years now he has fought, and I am afraid with very little encouragement, to instil some of his enthusiasm for vaccine and serum therapy into the rest of the veterinary profession, and I trust he will not be discouraged by what one can only describe as the appalling indifference, born, no doubt, of ignorance, exhibited by the main portion of his audience. Indeed, with the exception of one gentleman, who most rightly expressed his surprise that some members, including two professors, had evidently expected Mr. Scott to advocate the use of vaccine alone in such cases, no one appeared to have anything but the most elementary conception of what is meant by the words "vaccine or serum therapy," and, in fact, one gentleman quite naively dismissed the whole thing by suggesting he preferred to use a seton and have a good drainage. Of course, all the vaccines and serums (sera, if you like) in the world would have little or no effect unaided by any surgical interference on an old case of poll evil, but, if properly prepared and intelligently used, they will do all the author claims, and in all probability a good deal more, but I can hardly imagine a more difficult case for vaccines to be tried on or to prove their worth than an ancient one of "poll evil" or "fistulous withers."

Professor Wooldridge remarked that he had experienced more success from serums (what serum did he use by the way?) than from vaccines, and in reply to this even Mr. Scott fell into the very common error of imagining that a serum only confers a "short transitory degree of immunity," whereas one can demonstrate that in many diseases of a bacillary origin serum used in a big enough dose at first will bring about a permanent cure.

Serum, as distinct from a vaccine, is taken from the blood, and for curative or protective purposes the blood is drawn from an animal immediately after it has successfully overcome the toxic ravages of the organism causing the disease one is desirous of combating. The serum then contains antibodies very antagonistic to the organism in question that have been generated during the struggle. Everyone is aware of the almost infallible success of anti-diphtheritic serum, whilst in many countries (Germany particularly) tetanus is no longer regarded with the dread it once was, since thirty or more units of anti-tetanic serum are injected in one dose at the first onset of the symptoms. In veterinary practice it has been demonstrated in rinderpest that a large (100 c.c.) intra-jugular injection of anti-rinderpest serum will, if given in the very early stages, result in most gratifying recoveries. It is obviously the thing to demolish the enemy at once by putting a large force of antibodies (or whatever one chooses to call them) into the fray, rather than let the invaders have a chance of tackling the serum forces by sending them in small and repeated columns.

It is a vast and most fascinating subject, and as yet we are only on the threshold of it, but we must take care that it is not allowed to be pushed into the background and ignored. A recently-propounded treatment for sleeping sickness in the human subject shows us most unmistakably how useful and indeed necessary all forms of serum-application are becoming. For some years salvarsan has been used in the treatment of human trypanosomiasis

with very little success. The trypanosomes were eliminated from the blood stream by the salvarsan, yet the patient after a while again exhibited symptoms of the disease, and in most cases eventually died. It was then suggested and proved that as salvarsan, like most foreign bodies introduced into the blood stream, did not reach the cerebro-spinal fluid (this was demonstrated in research work on syphilis) that the organisms still existed alive in the cerebro-spinal fluid and were the cause of the recurrence of symptoms. Next it was thought that if some blood was drawn shortly after the salvarsan injection the resulting serum might contain some anti-trypanosomitic body or trypanolysin. This was done, and the serum obtained injected direct into the cerebro-spinal canal by lumbar puncture (first removing a similar quantity of cerebro-spinal fluid), and after various alterations in technique, the result up to date in one station alone is a list of 60 cases that have exhibited no symptoms for over a year, and in all probability are cured. This is unprecedented success in this disease, and is particularly interesting in view of the fact that serums have hitherto been considered of no use in protozoan conditions such as trypanosomiasis. Here, then, we have clear proof of cures in both bacillary and protozoal conditions, to say nothing of rinderpest, in which no organism has as yet been isolated or identified. Surely we have sufficient evidence to warrant a much larger use of these agents in the veterinary profession, but before this can be done more time must be given in our educational system to these subjects. The teaching in our colleges is antiquated, and any veterinary surgeon in Great Britain has only himself to thank if he finds himself adequately equipped with the knowledge to carry out research work of any kind. I am aware that the lack of State aid will be cited as the cause of this stagnation; but it is not all due to this. Teachers of the modern school capable of instilling the principles of vaccine and serum therapy, and the practical application thereof, must be installed in our colleges, and then perhaps, in years to come, when practitioners like Mr. Scott, who have worked at their own expense to further these subjects, take the trouble to expound their well-reasoned views before a professional audience, they will not be subjected to the indignity of having to argue the value of an auto-vaccine in comparison with that of a seton.—Yours faithfully, "M.R.C.V.S."

Army Veterinary Service.

LONDON GAZETTE.—WAR OFFICE.—TERRITORIAL FORCE.

September 30th.—C. H. Ducksbury to be lieutenant (July 31st).

REGULAR FORCES.

Sept. 30th.—Major A. G. Todd, C.B.E., D.S.O., relinquishes the acting rank of Lieut-Colonel on ceasing to hold the appointment of A.D.V.S. (August 18th).

Personal.

MARRIAGE.

VERNEY—SCOTT-REID.—At Holy Trinity Church, Karachi, on July 28th, 1921, Major Leonard Morris Verney, D.S.O., R.A.V.C., only son of Richard John Verney, M.R.C.V.S., Oxford, to Sydney Jessie Scott-Reid, M.R.C.S., L.R.C.P., Eng., elder daughter of the late Surgeon-General Sir Adam Scott-Reid, K.C.B., Indian Medical Service.

Diseases of Animals Acts, 1894 to 1914. Summary of Returns.

Period.	Rabies. Cases Confirmed. Dogs.	Rabies. Cases Confirmed. Other Animals.	Anthrax. Outbreaks confirmed.	Anthrax. Animals attacked.	Foot-and-Mouth Disease. Outbreaks confirmed.	Foot-and-Mouth Disease. Animals slaught'd as diseased or exposed to infection.	Glanders (including Farcy).* Outbreaks reported by the Local Authorities.	Glanders (including Farcy).* Animals attacked.	Parasitic Mange. Outbreaks reported by the Local Authorities.	Parasitic Mange. Animals attacked.	Sheep Scab. Outbreaks reported by the Local Authorities.	Swine Fever. Outbreaks confirmed.	Swine Fever. Swine slaughtered as diseased or exposed to infection
GT. BRITAIN.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Week ended 1st October, 1921	...	...	6	7	...	...	1	1	7	8	3	20	5
Corresponding Week in 1920	...	...	6	8	1	182	...	...	30	34	3	20	10
Corresponding Week in 1919	...	...	2	2	...	...	...	2	33	47	10	44	21
Corresponding Week in 1918	8	...	3	3	1	14	...	...	33	46	1	29	9
Total for 40 weeks, 1921 ...	22	1	389	503	43	2958	11	30	1823	2797	420	969	344
Corresponding period in 1920	23	...	321	390	75	9784	10	17	3166	5237	322	1527	616
Corresponding period in 1919	143	3	153	200	28	1595	21	54	4199	8396	235	1751	814
Corresponding period in 1918	15	1	192	222	2	22	25	70	3602	6775	261	1094	437

NOTE. The figures for the current year are approximate only. *Excluding outbreaks in Army horses.

IRELAND.							Outbreaks			
Week ended 1st October, 1921 ...	...	...	...	...	...	...	...	5	2	16
Corresponding Week in 1920 ...	...	...	...	...	...	...	...	9	1	2
Corresponding Week in 1919 ...	...	...	...	...	...	...	...	7	1	...
Corresponding Week in 1918 ...	...	...	...	...	...	...	...	8	...	...
Total for 40 weeks, 1921	1	1	7	77	...	...	70	214	87	479
Corresponding period in 1920 ...	1	1	...	...	1	3	86	249	11	28
Corresponding period in 1919 ...	...	...	...	...	1	1	126	193	30	92
Corresponding period in 1918 ...	2	2	...	...	...	...	92	230	22	72

NOTE.—The figures for the current year are approximate only.

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